



# **SWEDEN**

## **Economic and Social Analysis (ESA) of human activities at sea**

Third cycle of implementation of the Marine Strategy  
Framework Directive (MSFD) 2024-2029

## **Background: Marine Strategy Framework Directive (MSFD) 2008/56/EC**

The **Marine Strategy Framework Directive (MSFD) 2008/56** aims to achieve **Good Environmental Status (GES)** of marine waters across the European Union. To meet this overarching objective, Member States are required to develop and implement marine strategies composed of several key elements:

### **1. Initial Assessment, GES Determination, and Environmental Targets**

Under Articles 8, 9, and 10, Member States must:

- Conduct an initial assessment of the environmental status of their marine waters;
- Define what constitutes GES;
- Establish environmental targets to guide progress toward GES.

### **2. Monitoring Programmes**

Article 11 requires the development of monitoring programmes to enable ongoing assessment of marine environmental status.

### **3. Programmes of Measures**

Article 13 mandates the implementation of measures designed to achieve or maintain GES. As part of the initial assessment, Member States must also carry out an **Economic and Social Analysis (ESA)** of human activities related to the marine environment, including an evaluation of the cost of degradation.

## **Implementation Timeline**

Marine strategies follow a six-year implementation cycle:

- 1st Cycle: 2012–2017
- 2nd Cycle: 2018–2023
- 3rd Cycle: 2024–2029 (currently ongoing)

In 2024, Member States submitted updated reports under Articles 8, 9, and 10 for the third cycle.

For more information on the implementation of the MSFD, visit the European Commission's [MSFD page](#).

## **Economic and Social Analysis (ESA) Reports:**

As part of the MSFD reporting obligations, Member States must provide an **Economic and Social Analysis** of the blue economy. This analysis is integrated into the broader reporting package under Articles 8, 9, and 10, which includes:

- The status of marine waters;
- The determination of GES;
- Environmental targets to achieve GES.

The Economic and Social Analysis (ESA) reports for the 2024–2029 cycle are presented below in PDF format. These documents are available in English translation, with the original language included where applicable. Please scroll down to access the full content.

The full reports submitted under Articles 8, 9, and 10 are available here: [MSFD Reporting Portal](#).

For more information, you can visit the [national website](#).

## **Disclaimers**

### **1. On Translations**

*The English versions of the reports are generated using eTranslation, a machine translation tool provided by the European Commission. These translations are automated and may contain inaccuracies. The European Commission does not guarantee their accuracy and accepts no liability for any errors. Some content (e.g., images, videos, or files) may not be translated due to technical limitations.*

### **2. On Data Consistency**

*Differences in methodology and scope between the ESA conducted by Member States under the MSFD and the analyses by the EU Blue Economy Observatory (based on its indicator dashboards) may result in slight discrepancies in data and figures.*

## Economic analysis of the use of the sea

The sea is not only important for organisms living in or out of it, but is also the basis for significant economic sectors, including user and non-user values. According to the Marine Environment Regulation, the assessment of the North Sea and the Baltic Sea also includes an economic and social analysis of the use of the sea area, as well as the costs associated with the deterioration of the marine environment. These values can be described and estimated using socio-economic methods such as ecosystem services analysis.

Compared to previous status assessments, the ecosystem services analysis in this report has been more clearly linked to the assessment results for pressures and ecosystem components.

The sectors' dependence on ecosystem services is described, as well as the impact of deteriorating environmental status on the current availability of marine ecosystem services. It also describes the sectors and their development over time. Finally, it describes the socio-economic value of achieving good environmental status in Swedish waters.

### Current availability of marine ecosystem services

Failure of the marine environment to achieve good status entails negative impacts on the environment that limit access to marine ecosystem services. This will also reduce the benefits that marine ecosystems can provide us with people (Fact Box 17). Examples of environmental impacts in marine ecosystems affecting the status of ecosystem services include more turbidity of water, increased presence of algal blooms, reduced and changed fish supply, environmental toxins in fish and seafood, and biodiversity loss. The extent of welfare losses resulting from a deteriorating environmental status can be described by estimating societal losses and costs resulting from a deterioration of the marine environment (Fact Box 18).

#### Box 17. Marine ecosystem services

The biodiversity of marine ecosystems is important to humans in many different ways. To make the benefits of ecosystems for people visible, the concept of ecosystem services is used, i.e. the ability of the ecosystem to produce goods and services that are beneficial to society. The concept of Ecosystem Services can support governance, policy and societal debate by providing a complementary perspective to the scientific aspects. Marine ecosystems, for example, contribute to the biological regulation and purification of toxic substances, produce oxygen, food and raw materials, provide recreational opportunities and much more (Bryhn et al. 2015, HELCOM 2023e). Analysis of ecosystem services aims to identify and make visible the mutual links between the state of the environment and the contribution of the environment to human well-being, and to explain the costs for businesses and welfare losses for the public that a limited supply of marine ecosystem services results from.

In the past, the availability of marine ecosystem services has been assessed qualitatively, based on a study on Swedish marine ecosystem services (Bryhn et al. 2015) which was largely based on analyses of the state of the marine environment in the initial assessment of 2012 (Swedish Agency for Marine and Water Management in 2012), and updated for the period 2012-2018 (Swedish Agency for Marine and Water Management 2018a). Instead, the assessments for the period 2018-2023 are based on the quantitative assessments of environmental status presented in previous parts of this report, which have been analysed on the basis of the contribution of different descriptors to ecosystem services.

#### Box 18. Impact of deteriorating environmental status on human well-being and society

Whereas degradation of the marine environment reduces its ability to produce ecosystem services and also reduces benefits to society and human well-being; A deterioration in the environmental status may lead to impairments in values of use, which are the benefits that humans derive from the direct use of the environment, such as recreational or property values. It can also lead to a deterioration in the benefits that men derive from nature without directly using

or coming into contact with the marine environment, such as knowledge or appreciation of marine biodiversity itself. This section provides an overview of how the status of the environment in the Swedish seas affects the status of ecosystem services.

The cost to society of a deteriorating environmental status can be estimated, for example, by quantifying the economic losses resulting from the current lack of good environmental status, such as reduced landings of fish, loss of biodiversity or reduced recreational opportunities (Fisher et al. 2008). They can also be analysed by estimating the costs of achieving good environmental status at a certain time in the future (HELCOM 2023p). Some ecosystem services, such as those related to experience or biodiversity, are not relevant to monetary valuation. Another method is to measure what trade-offs individuals are willing to make between achieving a good marine environment and other goods and are served, usually money or income, or by observing people's behaviour (Segerson 2017). Such estimates are usually based on the results of surveys to affected sectors of society (HELCOM 2023p). There is as yet no established methodology for quantifying the costs of a deterioration of the marine environmental list at national level in Sweden.

Table 43 shows qualitatively how the status of the environment has changed over the latest assessment periods for a sample of three descriptors that have a significant impact on the availability of ecosystem services. The review illustrates how the status of the environment can affect the status of ecosystem services. The focus is biodiversity (D1), commercially exploited fish and crustaceans (D3), and fertilisation (D5). The selection was based on the fact that these descriptors contribute to the highest number of ecosystem services according to the more comprehensive qualitative evidence produced by Bryhn et al. (2015). A previous version of the table was also included in the previous assessment (Swedish Agency for Marine and Water Management 2018a). For the three descriptors selected, there are no signs of improvement in the status of the assessment periods 2012-2018 and 2018-2023 (Table 43). In conclusion, on the basis of this analysis, there is also no indication of an improvement in the availability of ecosystem services since the last assessment period.

**Table 43.** Assessment of changes in status between the periods 2012-2018 and 2018-2023 for Descriptors 1, 3 and 5 and for which marine ecosystem services these are relevant according to Bryhn et al. (2015). The assessment for 2012-2018 is from the Swedish Agency for Marine and Water Management (2018). The assessment for 2018-2023 is based on the information on the status of the descriptors in question as reported in this report. The classification of ecosystem services (S2, S3, etc.) according to Millenium Ecosystem Assessment is the same as used in the previous assessment (Agency for Marine and Water Management 2018), while ecosystem services marked with asterisk \* have been added to the table.

Descriptor	Comparison of assessment in 2012 and 2018	Comparison between assessment in 2018 and now	Summary of authorisation	Relevant Ecosystem services
<b>D1 Biogenicfald</b>	The situation was assessed as unchanged in both the North Sea and the Baltic Sea	Unchanged in both the North Sea and the Baltic Sea	Several components that are fundamental to the supply of ecosystem services are in bad status and no positive trend. There is a positive trend for a few components in both the Baltic and the North Sea, but also several which are negative or unchanged.	S2 Primary production S3 Nutrition fabric S4 Biodiversity S5 Food environment S6 Resilience R2 Sediment retention R3 Regulation of overfertilisation * R4 Biological regulation P1 Food * P2 Raw Materials * P3 Genetic Resources C2 Estetic values
<b>D3 Commercial fish &amp; shellfish</b>	The situation of populations in the Baltic Sea was assessed together as unchanged, while a positive trend was observed for some populations in the North Sea.	While trends in some populations in Bothnien, Kinga and North Sea are positive, for most populations the trend remains unchanged or negative.	Status unchanged or deteriorated for most populations. The status of demersal fish species in the Baltic Sea is considered critical.	S3 Nutrition fabric R3 Regulation of overfertilisation P1 Food P2 Raw Materials P3 Genetic Resources
<b>D5 Eutrophication</b>	The situation was assessed as comparable to the outcome of the initial assessment in 2012	The situation is assessed as comparable to the results of assessments 2012 and 2018	The supply of nutrients to the marine in the long term, but most of the coastal areas (excluding coastal areas in the northern Bothnian Sea and the North Gulf of Bothnia) and the offshore areas (except Skagerrak) are overfertilised. The regulation of eutrophication using, for example, eel grass and macroalgae remains largely unchanged in the North Sea and the Baltic Proper.	S1 Biogeochemical circuit S2 Primary production S3 Nutrition fabric * S4 Biodiversity * S5 Food environment * R3 Regulation of overfertilisation C2 Estetic values

Table 44 shows the current status of all ecosystem services assessed, based on the same reasoning on the relationship between the status of the ecosystem and the status of ecosystem services as in Table 43. Results from the previous assessment period are shown for comparison. However, there is a difference between the methods, as the previous assessment was made as a qualitative ex parte assessment (Agency for Marine and Water Management 2018a; assessment schools on the left). Instead, the status of ecosystem services for the period 2018-2023 (columns on the right) is developed on the basis of direct information on the status of the environment as described in previous parts of this report, combined with assessments of the contribution of the different descriptors to the different ecosystem services.

The classification (Table 44) shows that the status of all ecosystem services assessed, including several ecosystem services of great importance for Swedish economic sectors, is poor, to ex Empel S3 nutrient dynamics, R5 Regulation of pollution, P1 Food, and R1 Climate Reg. (see further paragraph 'Human activities' dependence on ecosystem services). The fact that the 2018-2023 classification shows a clearly worse status than the 2012-2018 assessment is unlikely to be primarily due to a marked deterioration in the situation over

a short period of time, but largely reflects the fact that the new status assessment is based on quantitative assessments of the status of descriptors contributing to ecosystem services (according to other parts of this report), and not on expert judgement.

However, the poor status of ecosystem services in 2018-2023 clearly reflects that the state of the environment is serious also from a socio-economic point of view and given the need to ensure the long-term sustainability of the ecosystem. The time horizon is of great importance, as in most cases clear improvements in environmental status within a management cycle cannot be expected, even if measures are put in place, but can take decades. However, the method for classifying the status of ecosystem services is broadly defined with only three classes: poor, moderate, good. A relatively large change is needed to justify reclassification, and analysis at this overall level does not reflect the effects of the individual pressures, species or ecosystem components that contribute to the assessed state of an ecosystem service. For example, improvements in the status of an individual fish species do not indicate the status of the ecosystem service of foodstuffs when other species are unchanged or have deteriorated. Thus, major changes are needed for several key species or ecosystem components to lead to a change in classification.

**Table 44.** Assessment of the status of ecosystem services in Swedish sea basins. Green box and bock symbol: good status, yellow and the symbol stroke: moderate status, red and symbol X: bad status. The classification of ecosystem services (S1, S2, etc.) is according to Millenium Ecosystem Assessment and is the same as in the previous assessment (Swedish Agency for Marine and Water Management 2018a). The status assessment for 2023 is based on information on the status of the marine environment as set out in the previous chapters of this report (by descriptor and sea basin, and for D1 per ecosystem component), combined with an analysis of their contribution to the respective ecosystem service. The assessment is affected by the poor status of the environment according to the previous chapters of the report. The qualitative status assessment for 2018 is for comparison.

Ecosystem services	Status assessment in 2018			Status assessment in 2023		
	Western seas	Baltic Proper	Bothnian Bay	Western seas	Baltic Proper	Bothnian Bay
S1 Biochemical cycle	Unchanged	Unchanged	Unchanged	Deteriorated	Deteriorated	Deteriorated
S2 Primary production	Unchanged	Unchanged	Unchanged	Deteriorated X	Deteriorated X	Deteriorated X
S3 Enterprise and Hydrogen dynamism	Unchanged	Unchanged	Unchanged	Unchanged	Unchanged	Unchanged
S4 Biological diversity	Unchanged	Unchanged	Unchanged	Deteriorated	Deteriorated	Deteriorated
S5 Food environment	Unchanged X	Unchanged X	Unchanged	Unchanged X	Unchanged X	Deteriorated X
S6 Resilience	Unchanged	Unchanged	Unchanged	Deteriorated X	Deteriorated X	Deteriorated X
R1 Climate Regulation	Unchanged	Unchanged	Unchanged	Deteriorated X	Deteriorated X	Deteriorated X
R2 Sediment — preservation	Unchanged	Unchanged	Unchanged	Deteriorated	Deteriorated	Deteriorated
R3 Reduction eutrophication	Unchanged	Unchanged	Unchanged	Deteriorated	Deteriorated	Deteriorated
R4 Biological treatment	Unchanged	Unchanged	Unchanged	Deteriorated X	Deteriorated X	Deteriorated X
R5 Regulation of contaminants	Unchanged	Unchanged	Unchanged	Deteriorated	Deteriorated	Deteriorated
P1 Food	Increasing X	Unchanged X	Unchanged X	Unchanged X	Unchanged X	Unchanged X
P2 Raw Materials	Increasing X	Unchanged	Unchanged	Unchanged X	Deteriorated X	Deteriorated X
Ecosystem services	Status assessment Western seas	year 2018 Baltic Proper	Bothnian Bay	Status assessment Western seas	year 2023 Baltic Proper	Bothnian Bay

		Carried	requested
P3 Genetic Resources		X	X
P4 Chemicals		Not assessed	Not assessed
P5 decorations		Not assessed	Not assessed
P6 Energy		Not assessed	Not assessed

## Dependence of human activities on ecosystem services

Table 45 shows an overall assessment of the dependence of different human activities on different ecosystem services. The table represents a sample (relevant for Sweden) of activities listed in Table 2a, Annex 3 of the MSFD. The analysis is carried out at an overall level, broken down into the North Sea and the Baltic Sea. See short description of methodology in Box 19.

The results of the analysis show that three human activities in particular depend heavily on the availability of ecosystem services: marine tourism and recreation, professional fishing and recreational fisheries (Table 45, Figure 49). The analysis separates marine tourism and recreation from recreational fisheries, to highlight that recreational fisheries are more directly linked to the availability of fish as a resource than many other forms of tourism, and because the areas of exercise are slightly different (although recreational fishing is in practice part of marine tourism and recreation).

### Box 19. Methodology for assessing the dependence of human activities on ecosystem services

To estimate the link between human activities and ecosystem services, previous methods of semi-quantitative expert judgement were developed (Bryhn et al. 2015, 2020a) and of a previously complex model (Ivarsson et al. 2017). This is because there is not enough data available for purely quantitative purposes. The methodology involves a group of experts agreeing on a value between 0 and 4 for the activity’s dependency on each of the 23 ecosystem services included in the analysis. In the final assessment, the scores for each activity are added to a final result.

Whereas commercial fishing depends primarily on supporting ecosystem services such as S3 Enterprise, S4 Biodiversity and S5 Life, but also on regulated ecosystem services such as R3 Reduction of eutrophication, R4 Biological Regulation and R5 Control of Toxic Substances; All these ecosystem services are a prerequisite for the availability of P1 Food, i.e. seafood. Recreational fisheries have the same dependence on supportive ecosystem services, but also funturally ecosystem services such as C1 Recreation, C5 Inspiration and C6 natural heritage create added value for recreational fisheries. For marine tourism and recreation, supporting ecosystem services such as S2 Primary Production, S4 Biodiversity and S5 Living are important, but also for example the regulated ecosystem service R3 Reducing eutrophication by reducing algal blooms and neglecting water quality. In addition, the availability of cultural ecosystem services creates experiences for people visiting, living and staying at the sea. There are also several offshore activities whose dependence on individual ecosystem services is low, they can be continued regardless of the state of the ecosystem services, but their activities depend entirely on the sea, such as shipping,

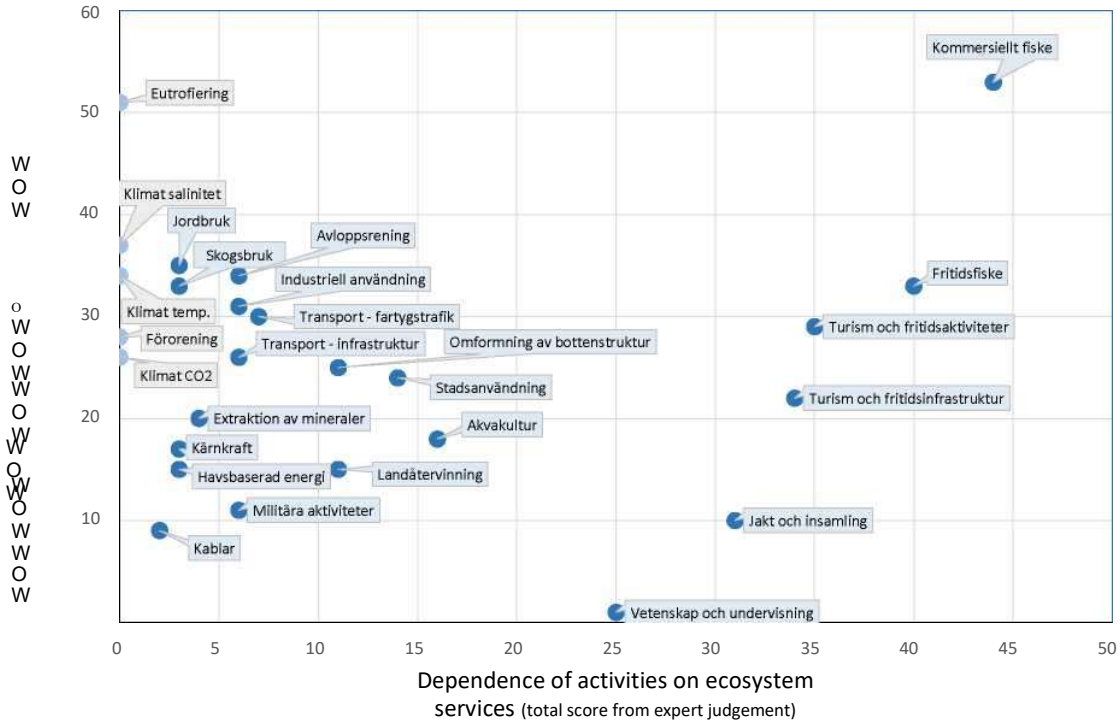
port activities and offshore energy. For agriculture and forestry, the ocean's climate-regulating capacity, R1 climate regulation, is assessed as the most important ecosystem service.

The relationship between human activities and the status of ecosystem services is in many cases double-targeted – in addition to being dependent on ecosystem services, many activities have an impact on the environment that affects the status of ecosystem services. When combining the information in Table 45 with the corresponding information on the effect the same activities have on ecosystem services (Krauf- Velin et al. 2018), gives an overview of how these relationships interact (Figure 49).

**Tabell 45.** Dependence of activities on ecosystem services; Dependency is assessed on a scale from 1 to 4, with 1 indicating low dependency and 4 high dependency. An empty cell (no number) corresponds to no dependency. Source: Kraufvelin and Others In 2018, the dependence on the activity Renewable energy from the Raw Materials Service has been revised upwards from 0 to 1. The dependence of commercial fisheries on raw materials has also been revised upwards from 2 to 4.

Ecosystem services	Renewable Energy	Commercial fishing	Aquaculture	Portoperations	Agriculture	Forestry	Shipping	Industry	Waste water treatment plant (discharge)	Marine tourism/recreation	Recreational fisheries
S1 Biochemical cycles		1	1	1			1	1	1	1	1
S2 Primary production		3								2	3
S3 Nutrition dynamics		4	1							1	4
S4 Biodiversity		4	1							2	4
S5 Food environment		4	1							2	4
S6 Resilience		2	1							1	2
R1 Climate Regulation	1	1		1	2	2	1	1		1	1
R2 Sedimentary conservation		1		1			1				
R3 Reduction of eutrophication		4	1						1	2	1
R4 Biological regulation		4	1								1
R5 Pollutant control <sup>55</sup>		2	2						1	1	1
P1 Food		4	2	1			1		1	1	2
P2 Raw Materials	1	4	1					1	1		
P3 Genetic Resources <sup>56</sup>		1	1								
P4 Chemicals		1						1			
P5 decorations										1	1
P6 Energy	1	1						1			
C1 Correction				1			1			4	4
C2 Estetic values							1			4	2
C3 Science and education	1	2	2					1	1		1
C4 Cultural heritage		1	1	1	1	1	1			4	2
C5 Inspiration		1								4	4
C6 natural heritage		1								4	4

R555 refers to the contribution of nature to the binding of toxic substances in organic matter which settles and to a certain proportion of: permanently detained in the sediment on accumulative beds, so that substances are transported away from the biological cycle.  
56P3 refers to genetic material for release and cultivation.



**Figure 49.** Relationship between the dependency of human (marine related) activities on ecosystem services (x-axis) and the impacts of the same activities on ecosystem services (y axis) when using the described expert assessment methodology. These relationships are shown as dark blue points. In addition, pressures from past human activities continue to have an impact on the current availability of ecosystem services. These are shown as light blue points with edge and have a value of 0 on the x-axis as they are not dependent on current marine ecosystem services. Source: Modified to Swedish from Bryhn et al. 2020a.

### Deepening: ecosystem services on which commercial fishing depends

The ecosystem services on which commercial fishing depends are in poor status. The status of the essential ecosystem service P1 Food for commercial fishing is assessed as poor due to the weak status of the commercially exploited fish species, but also, for example, to the presence of environmental gifter. In the Baltic Sea, the presence of dioxins in fish is an obstacle to the sale and consumption of fatty fish, as these are subject to control dietary advice in Sweden and marketing bans in other countries (Bryhn et al. 2015). From an ecosystem perspective, these factors mean that commercial fishing currently delivers below the capacity that could be available if the status of the environment were sustainable in the long term, as the ecosystem is unable to deliver the stream of ecosystem services it has the potential to do. In particular, Flö's ecosystem services are limited for S3 nutrient dynamics, S5 Food environment and P1 Food.

### Deepening: ecosystem services on which marine tourism depends

Marine tourism depends on the status of the environment in many ways, including through cultural ecosystem services. Cultural ecosystem services have not been included in the assessment in Table 44, f.s. these should be estimated using a different methodology than the one used there. The Agency for Marine and Water Management (2018a) assessed the status as moderate for most cultural ecosystem services, except C3 Science and Education and C5 Inspiration, which was assessed to be in good status. Dessa bedömningar är sannolikt fortfarande relevanta, baserat på den generella slutsatsen i denna rapport att miljöns status inte har förbättrats mellan de två bedömningsperioderna. The attractiveness of marine tourism is therefore clearly lower than it could be under a consistently good status scenario. The ecosystem service C2 Estetic values is important for an attractive coastal environment and for C1 Correction. It is heavily affected by eutrophication, which reduces both the depth of vision and the possibility of recreation and bathing. The presence of marine litter also has a negative impact on the experience of the marine environment (Bryhn et al. 2015). C4 Cultural heritage,

for example, is represented by coastal communities, fishing routes and marine wrecks, and the status has been assessed as moderate. The loss of small-scale fishing due to changes in commercial fishing makes it difficult to maintain the traditions of professional fishing. Today's environmental status also reduces the depth of vision, which reduces the experience of recreational activities at the water (Garpe 2008).

## **Economic statistics for industries dependent on the sea**

This section describes Swedish economic statistics from 2014-2020 for the maritime industries that depend on the sea. It also describes the value of benefits linked to recreational activities on the coast, as well as fishing.

In total, the net turnover of the maritime industries was SEK 106 billion, the value of processing was SEK 31 billion and exports amounted to SEK 12 billion annually, as an annual average over the seven-year period 2014-2020. Value added represented 0.6 % of Swedish gross domestic product both in 2018-2019 and in the COVID year 2020.

The transport segment represented the largest share of maritime activities in terms of both total net turnover and value added, while exports were dominated by the 'technology and production' segment. There are some differences between sea basins. Net turnover in the maritime sector has increased overall in 2014-2020 and there has been an increase in efficiency in several of its segments.

The number of guest nights in visiting facilities in the coastal area has increased over time (2014-2019). Commercial (commercial) fishing has increased in the value of landings (2014-2020), but the number of commercial fishing has decreased. During the same period, recreational fishing has remained unchanged.

This section is a summary of a more detailed analysis that will be published shortly (Koehler et al. 2023), and details of statistical trend analyses and the economic indicators associated with the analysis will be available.

### **Methodology for analysing economic statistics for maritime industries**

The description of trends in this chapter sets out statistically significant trends at 95 % confidence level, tested with linear mixed effect models. The maritime economy was analysed in terms of net turnover, value added and exports for five segments of industry:

- "marine as a natural resource": fisheries and aquaculture, energy, minerals and bio-resources;
- "service": ship brokerage, insurance companies and commercial mariners;
- "maritime technology and production": shipbuilding and recreational craft industry, but also technical and system suppliers and other suppliers of maritime industries
- "transport" means: shipping companies, ports and logistic companies; and
- "leisure and tourism": ferry and specialised retail trade services of boats.

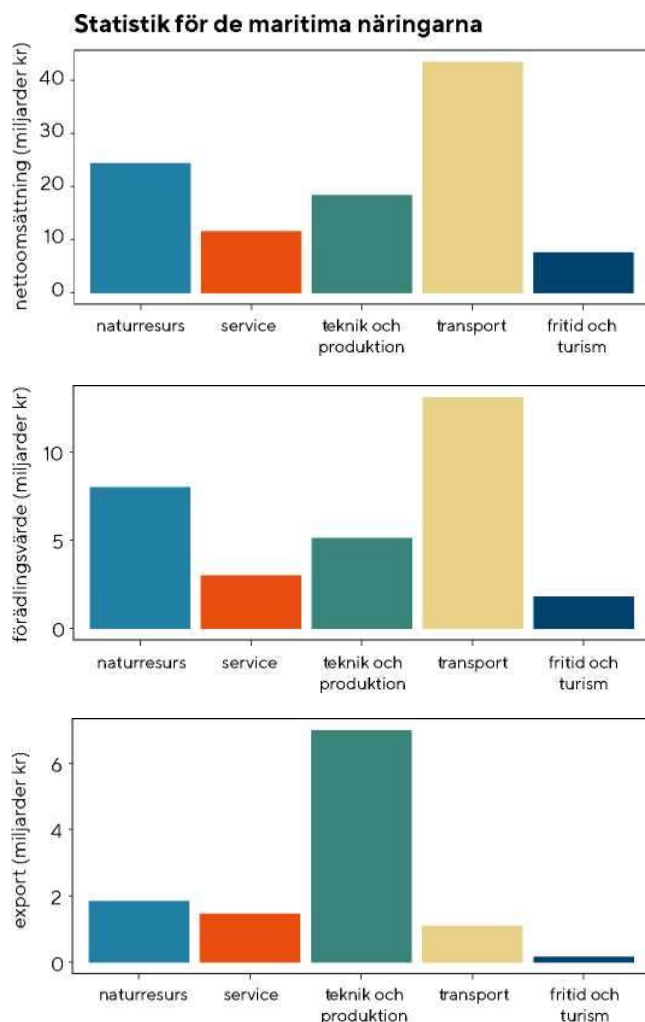
The analyses have followed the categories of industry segments used by Statistics Sweden (SCB), which supplied the main data for the analysis, for the maritime economy. However, the categories of maritime strategy do not correspond directly to those used in HaV's maritime strategy and are therefore not directly comparable. This applies in particular to the 'leisure and tourism' segment, which has a relatively limited definition in relation to all maritime leisure and tourism activities. For example, hotels and restaurants are excluded. For this reason, the analysis for this marine nutrient segment, as defined by SCB, was supplemented by data relating to holiday homes, visiting facilities and overnight stays in the coastal area (see Deep: the economic value of the past on the coast).

The statistics used current prices, i.e. prices not corrected for inflation or purchasing power. The 'coastal zone' was defined as an area covered by coastal municipalities within a distance of 5 km from

the coast. These were divided into four groups (areas): The Gulf of Bothnia, the Baltic Proper and the North Sea (municipalities with up to 10 000 inhabitants in any of these three sea basins) and a category 'Other (coastal/coastal)' (other coastal municipalities with more than 10 000 inhabitants and inland coastal municipalities less than 5 km distant from the coast). The term 'Whole Empire' below includes all four non-overlapping groups.

### **Net turnover, value added and exports of the maritime industries**

On average over the seven-year period studied, the transport segment represented the largest share of total net turnover and of value added of the maritime industries (Figure 50). An example of value added in the transport sector is the value added of a shipping company's ferry business for one year, minus the value of its inputs. Exports were dominated by the 'technology and production' segment. The natural resources segment also has one of the larger shares, but it needs to be taken into account that some industries included here receive their resources from other countries, where, for example, fish, shellfish and molluscs are processed, processed for shelf-life or sold in Sweden. The 'free time and tourism' segment, according to the classification used (SCB's definition), had a relatively small turnover, which is due to the fact that only ferry services and specialised retail trade of boats were included. Instead, the data selection carried out for the Maritime and Water Agency's maritime strategy, which included, ex emptively, hotel and restaurant activities, showed that marine tourism is a dominant marine industry in Sweden (Bryhn et al. 2020a, see also Figure 52). The difference is solely due to the fact that different data samples have been selected in the respective analyses.

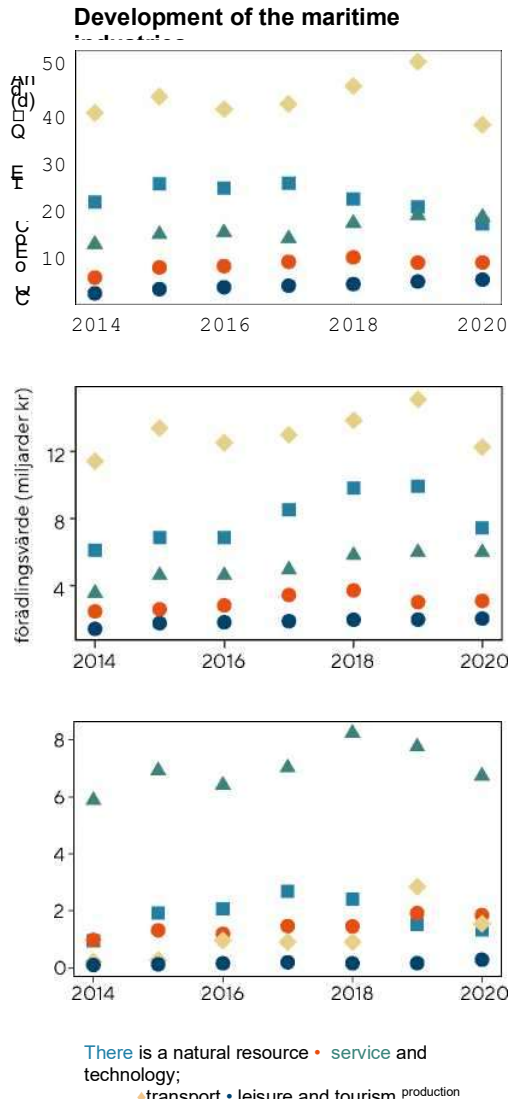


**Figure 50.** Total net turnover, value added and exports per maritime industry segment, averaged over the seven-year period 2014-2020 (SEK billion). Analysis based on SCB data. It should be noted that the 'Free Time and Tourism' segment here contains only ferry services and specialised retail trade in boats (SCB's classification), and therefore shows a relatively small turnover. However, leisure and tourism are an important part of the Swedish maritime economy if, for example, hotels and restaurants are also included (Bryhn et al. 2020a).

There are some differences between sea basins. The largest net turnover was found in the category 'Other (coastal/coastal)'. Among the three sea basins, the total number of companies, the number of employees, net turnover and exports were highest in the North Sea, followed by the Baltic Proper (except for exports that were higher in the Gulf of Bothnia). In the North Sea, net turnover was dominated by one of the segments of natural resource, followed by technology and production, and transport and in the Eastern-Sea Gene dominated transport, followed by technology and production, and natural resource. In the Gulf of Bothnia and elsewhere, the transport segment dominated, followed by natural resources, technology and production.

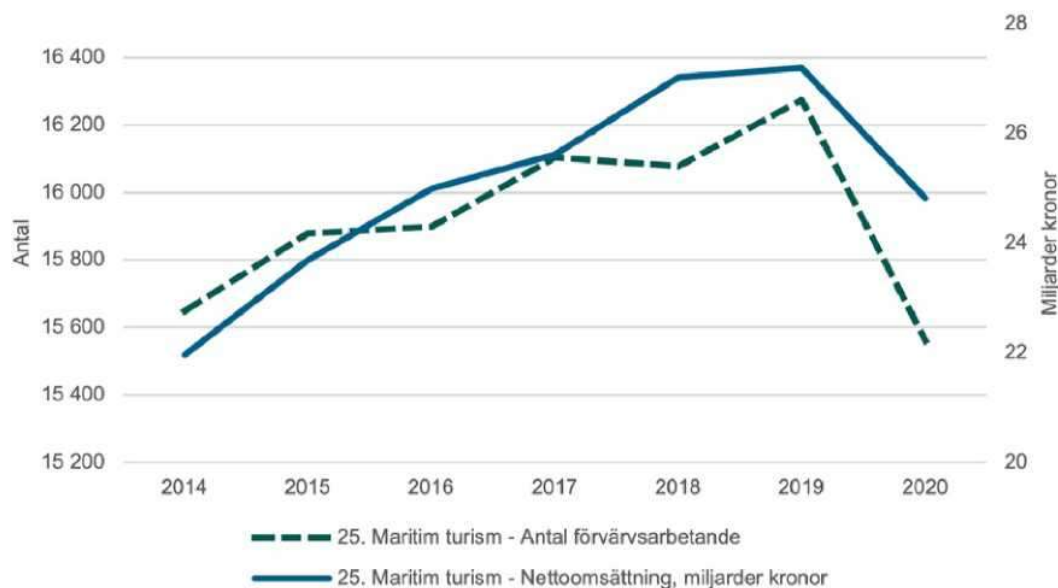
### Time trends for maritime industries

The text below sets out statistically significant trends for the Swedish maritime industries. For the whole country (coastal/coastal areas), there is an increasing net turnover in 'service', 'leisure and tourism', and 'technology and production' (not adjusted for inflation) in the period 2014-2020. Excluding the year 2020 (with COVID restrictions) shows an increasing trend for the transport segment (Figure 51). Exports have increased in 2014-2020 in "services", "leisure and tourism", "transport", and "technology and production". Leaving out the year(s) of COVID restrictions, there were also increasing trends in the 'sea as a natural resource' in 2014-2018, and in 'technology and production' between 2014 and 2019.



**Figure 51.** Trends in total net turnover (top), exports (middle) and value added (bottom) in the various maritime industry segments (SEK billion), in the years 2014-2020, according to the SCB classification. Analysis based on SCB data.

Value added has increased in 2014-2020 in 'technology and production', as well as 'leisure and tourism', and, in the absence of COVID years/one, also in the 'sea as a natural resource' (both in the 2014-2018 and 2014-2019 periods). However, these trends may also point to the existence of data in relation to prices without correction for inflation. Even with the data selection for Sweden's (2015) maritime strategy, the overall number of employees and net turnover in maritime tourism in Sweden has increased in 2014-2020, with the exception of a decline in the 2020 pandemic year (Figure 52).



**Figure 52.** Maritime tourism. Number of persons in employment and net turnover (SEK billion) for the years 2014-2020 in maritime tourism according to the classification used in Sweden's (2015) maritime strategy, where, for example, hotel and restaurant activities have been included in the nutrition segment. Source: Swedish Agency for Marine and Water Management<sup>57</sup>.

The sea areas differ in this respect. The North Sea has shown the most notable change in the service segments. For example, the number of companies and employees has increased, while wages and other benefits as well as total costs have decreased, indicating an expansion and impact of the sector. On the other hand, the number of enterprises in the North Sea has fallen, in the areas of 'leisure and tourism', 'technology and production', and 'the sea as a natural resource'. Efficiencies (i.e. reduced costs in parallel with increasing turnover) were also seen in the 'service' and 'leisure and tourism' for the Baltic Proper, as well as in 'technology and production' for the Baltic Proper and the Gulf of Bothnia. The "leisure and tourism" in the Gulf of Bothnia has also been streamlined. On the other hand, in the Baltic Proper and the Gulf of Bothnia there has been a decline in the 'sea as a natural resource'. More detailed information on trends in individual economic indicators can be found in a forthcoming report (Koehler et al. 2023).

### Deepening: economic value of fishing

Fisheries are usually divided into the two categories of commercial (professional) and recreational fisheries. To further and more explicitly highlight the economic value of commercial and recreational fishing in Sweden's seas, data for the years 2014-2020 are reported here from the Swedish Agency for Marine and Water Management.

#### *Commercial (commercial) fishing*

Employment in commercial fisheries has varied between 720 and 920 FTEs in 2014-2020, with an average of 810. The number of maritime commercial fishing enterprises has been declining for a long time, with the sector comprising 990 vessels in 2022.

The number of employees in commercial fisheries has decreased over the seven year period analysed (Figure 53), while the landing value has increased. The landing value was on average SEK 1.17 billion, with a variation of SEK 0.98-1.26 billion over the years.

<sup>57</sup> follow-up of the Maritime Strategy, 2020, PHASS-/[www.havochvatten.se/planering-forvaltning-och-samverkan/program-projektand-second-mission/maritime-strategy/depopulation/den-maritima-strategy.html](http://www.havochvatten.se/planering-forvaltning-och-samverkan/program-projektand-second-mission/maritime-strategy/depopulation/den-maritima-strategy.html)

The added value was SEK 0.58 billion on average, ranging from SEK 0.45 billion to SEK 0.63 billion in 2014-2020. There was no significant trend in added value, i.e. the value that commercial fishing has added to gross domestic product has neither increased nor decreased.

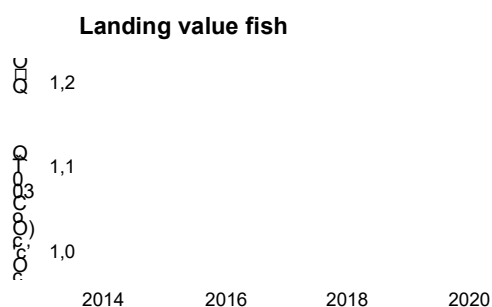
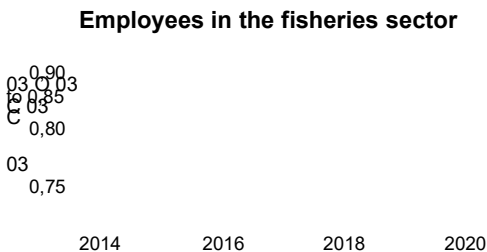


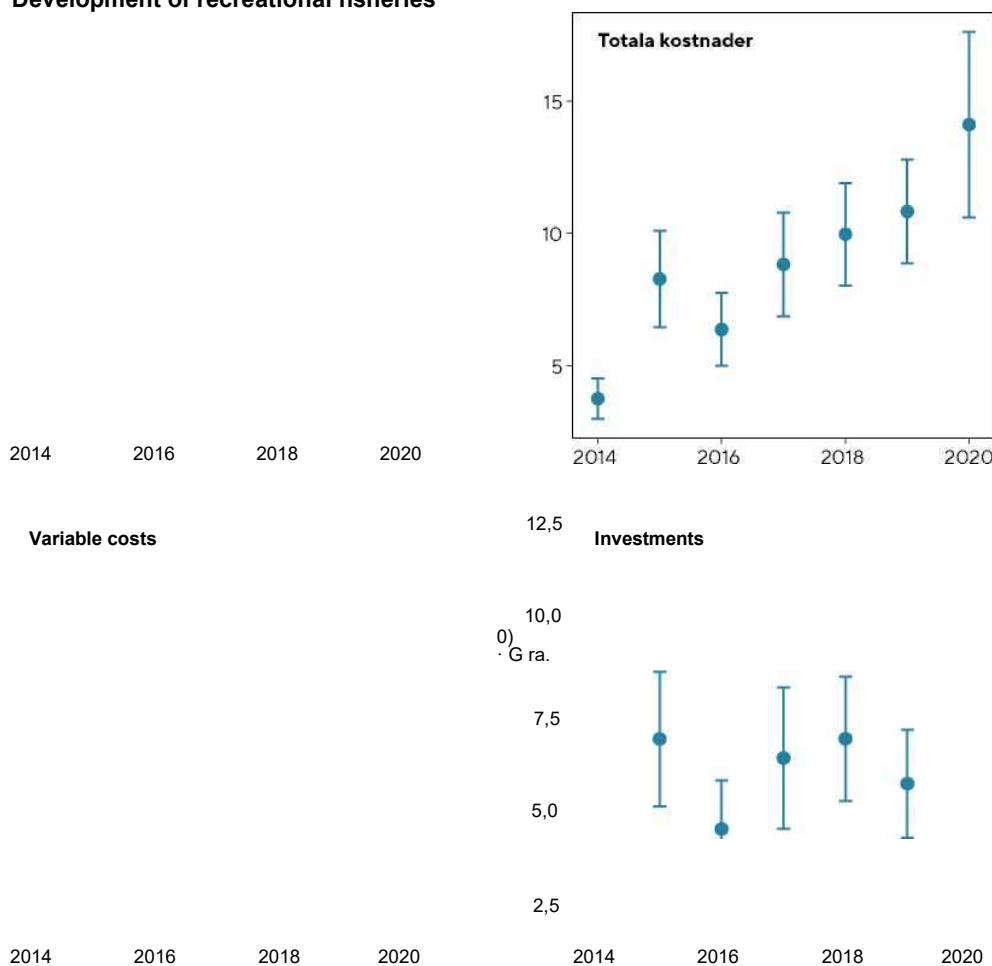
Figure 53. Economic indicators of commercial fishing in Sweden's seas with number of employees (in thousands, top), landing value (SEK billion, bottom). Source: Swedish Agency for Marine and

**Recreational fisheries**

Recreational fisheries include sport and subsistence fisheries. In 2022, over 600 000 people engaged in recreational fishing in Sweden's sea basins, most of them in the Baltic Proper or the North Sea. In the period 2014-2020, recreational fishing represented on average 12.2 million fishing days, with a clear maximum value during the COVID pandemic year 2020. Investments in recreational fisheries (e.g. gear, boats) averaged SEK 6.1 billion, ranging from SEK 2.7 billion to SEK 9.5 billion.

Recreational fishing has become more expensive over the period, but this has not significantly affected the net set. In recreational fisheries, there were no significant trends in number of fishing days or investments in the period 2014-2020 (Figure 54), but total and variable costs have increased.

### Development of recreational fisheries



**Figure 54.** Days of recreational fisheries and economic indicators for recreational fisheries in Sweden's seas (+ standard errors): fishing days (in millions, at the top left), total costs (in billion SEK, top right), variable costs (in billions of SEK, bottom left) and investments (in billions of SEK, bottom right), years 2014-2020. Source: The Swedish Agency for Marine and Water Management.

### Deepening: economic value of coastal recreation

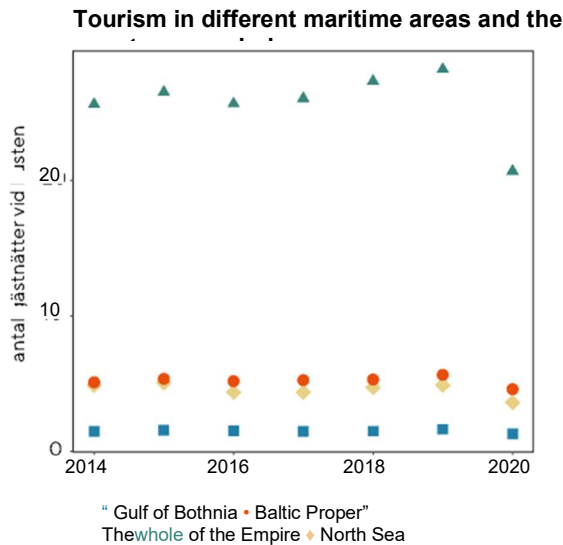
The statistics for the 'Freedom and Tourism' segment in Section 1.1 included ferry services and specialised retail trade of boats. The following paragraph describes statistics on the number of holiday homes, visiting facilities and guest nights on the coast. The analysis is based on data from Statistics Sweden.

The number of holiday homes per area shows where recreation is linked to the marine environment. The number of holiday homes in the coastal area is highest in the Baltic Proper. The number of holiday homes on the coast remained unchanged between 2014 and 2020 at the North Sea, the Baltic Proper and the Gulf of Bothnia, but increased in the category 'Öv riga (coast/coastal)'. The number of visits to the coastal area is highest in the Baltic Proper, followed by the North Sea and then the Bothnian Viken. The number of facilities visited did not show any trends for the seven-year period 2014-2020.

The largest number of guest nights in visiting facilities in the coastal area have been reported for LakeEast Easter, followed closely by the North Sea. The Gulf of Bothnia had about one third of as many annual guest networks as the other two sea basins. Low numbers of guest nights are seen throughout the country for the year 2020 (during the COVID pandemic). Apart from this particular year,

there is an increasing trend in the number of guest nights throughout the country (coastal/coastal), between 2014 and 2019 (Figure 55). Most of the guest nights in the coastal area

takes place during the summer months (June to August). The share of guest nights in the rest of the year varied between 28 and 35 %, showing no trend over the seven-year period.



**Figure 55.** Number of guest nights in the coastal zone by sea area, and throughout the country (coastal/coastal) (millions), from 2014 to 2020. Analysis based on SCB data.

## The value of good environmental status in Swedish sea basins

In order to estimate the socio-economic value of maintaining, improving or deteriorating the environment, different methods can be used to estimate the benefits of different measures in the marine environment for people and communities. In recent years, a number of such studies have been carried out which are relevant to Swedish sea basins. Although these studies often contain poorly weighted assumptions and calculation uncertainties, they provide an important indication of the values provided by the environmental status of the sea.

For example, it seems that the estimated value for people and communities of achieving good environmental status with regard to eutrophication in the Baltic Sea according to the HELCOM Baltic Sea Action 59 Plan exceeds the cost of necessary measures (Ahtiainen’s Öhman, 2014). The value of achieving good environmental status under the Marine Environment Directive in Finnish marine areas has been estimated at SEK 4,9-5.7 billion annually (Nieminen et al., 2019).

A similar study for Swedish circumstances has been carried out by Nordzell et al. (2020). During the period, the willingness to pay was sought in order to achieve good environmental status (under the Marine Environment Ordinance) in Swedish marine waters in 2040, as a basis for updating the programme of measures for the marine environment. The study used a scenario valuation methodology (Stated Preferences) and was based on the results of a survey, answered by a limited but representative sample of the Swedish population. According to the study, the median value of respondents’ willingness to pay to achieve good environmental status in the oceans was SEK 500 per year, and the average was SEK 1 075 per year. The willingness to pay varied widely among the respondents and 18 % lacked any willingness to pay for this. Hazardous substances were the marine environmental problem considered most important to spend public funds, followed by weakened fish stocks and overfertilisation. Respondents who were usually present on the west coast had a slightly higher willingness to pay than those usually present on the east coast. Overall, Sweden estimated a total willingness to pay of SEK 8.2 billion annually for achieving good environmental status in the surrounding seas by 2040 (Nordzell et al., 2020). This was a higher estimate than in the Finnish study

59 Helcom Baltic Sea Action Plan (HELCOM Baltic Sea Action Plan)/www.helcom.fi/baltic-sea-action-plan

by Nieminen et al. (2019) but it should be noted in this context that Sweden has a larger population than Finland (Finland had a higher willingness to pay per person). There are also methodological differences between the studies.

## Summary and synthesis of the use of the sea

Swedish seas could bring greater socio-economic benefits if they were healthier. The economical analysis shows that the current state of the environment severely limits the availability of ecosystem services. Commercial fishing, marine tourism and recreation are among the economic activities that are particularly affected by the deterioration of the marine environment. The willingness to pay for measures to improve the current supply of ecosystem services to a 'good environmental status' scenario has been estimated at SEK 8.2 billion per year.

The ecosystem services on which commercial fishing depends are in poor status. This means that the fishing profession cannot generate as much economic value as it could in a good environmental status scenario.

The status is moderate or poor for almost all ecosystem services on which marine tourism depends. Whereas ecosystem services related to aesthetic values and recreation are adversely affected by, inter alia, eutrophication, marine litter, and deteriorating opportunities to sustain fishing trades; The attractiveness of marine tourism is therefore lower, and so is the sector's revenues, than it could be under a consistently good status scenario.

The transport segment has a low dependence on ecosystem services from the sea.

Transport accounted for the largest share of maritime industries in terms of both total net turnover and value added in the period studied 2014-2020.

Commercial (commercial) fishing has increased in the value of landings in 2014-2020, but the number of stands in commercial fisheries has decreased. During the same period, the scope of recreational fishing remained unchanged. The number of guest nights in visiting facilities in the coastal area has increased between 2014 and 2019.

Overall, the net turnover of the maritime industries amounted to SEK 106 billion per year on average and it has generally increased in the maritime sector over the years 2014-2020 (current prices). Value added represents 0.6 % of Swedish gross domestic product. There is a variation across sea basins in terms of the relative importance of the different marine nutrient segments, and in trends over time.

## From assessment to action: environmental quality standards as a tool

The assessment of the state of the marine environment, together with the definition of good environmental status, is the starting point for marine governance. If good environmental status is not reached or in order to maintain good environmental status, environmental quality standards are also developed with indicators (Section 19 of the Marine Environment Ordinance). These can be found in Annex 3 of the Marine Environment Regulations (HVMFS 2012-18). Indicators with target values to assess compliance with the EQS are added to the EQS (Faktaruta 20). EQS with indicators shall be updated at least every six years, based on the outcome of the status assessment. Work is ongoing on the development of a fully-fledged system of environmental quality standards and associated measurable indicators for the follow-up of standards and measures. Table 46 gives an overview of the status of the EQS adopted in 2023.

### Box 20. Environmental Quality Standards

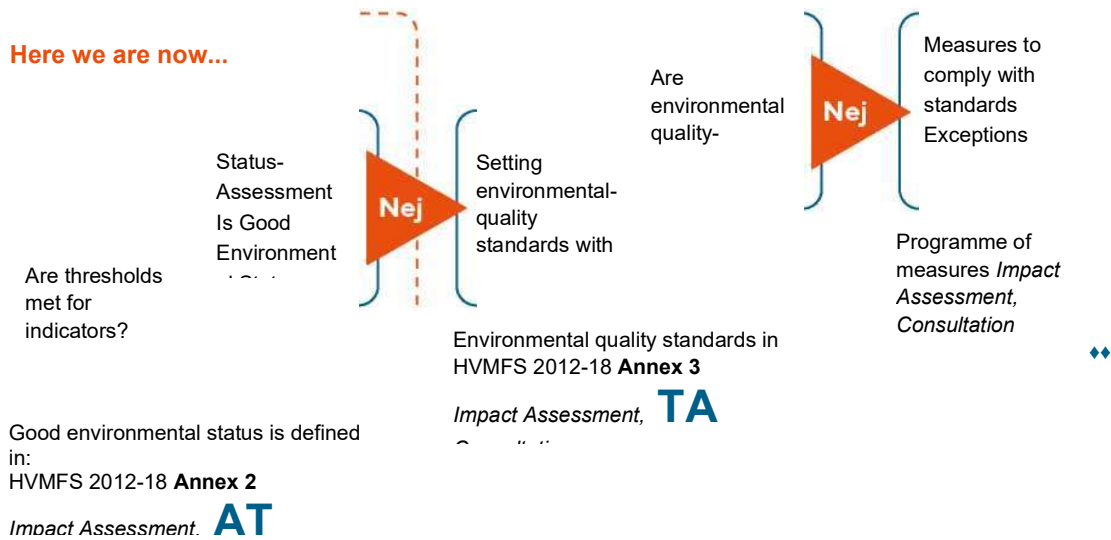
Environmental quality standards are instruments to ensure that good environmental status in marine environmental management is maintained or achieved. Environmental quality standards may indicate levels of pollution or disturbance that humans, the environment or nature can be exposed to without danger. They may also consist of limit values or guide values, indicate the highest or minimum presence of organisms in surface or groundwater, or take the form of other requirements relating to environmental quality as a result of Sweden's membership of the EU. See Chapter 5, Section 2 of the Environmental Code. In Sweden, environmental quality standards have been in place for water, air and noise.

The environmental quality standards in turn form the basis for assessing which measures are included in the programme of measures (Section 24 of the Marine Environment Ordinance). When an environmental quality standard is not complied with, a holistic approach is needed, highlighting the causes and impacts on the environment and society, what authorities and municipalities need to do, and how the burden of reducing impacts is to be brought between different actors, sources and instruments. The programme of measures is therefore prepared by means of a "GAP analysis" gathering knowledge of measures, costs, impacts, etc., complementing and deepening the information from the status assessments.

The main objective of the action programme is to comply with environmental quality standards with indicators and to reduce pressures on the marine environment. Table 46 gives an overview of which measures have been decided in relation to the respective EQS. Please note that most of the measures cannot be sorted under a single standard, or are developed on the basis of the overall GES standard. They include ÅPH 10, ÅPH 24-25, ÅPH 26-28, ÅPH 29-31, ÅPH 44-45.

Where it is considered that good environmental status cannot be achieved, there are also certain possibilities for derogations (Section 29 of the Marine Environment Ordinance) for certain characteristics or in a specific geographical area. The existing exemptions are set out in the chapters on permits and loads.

In the context of updating regulations and programmes of measures, impact assessments or descriptions are also produced. Figure 56 shows the flow from status assessment to measures.



**Figure 56.** The flow within marine environmental management (Sweden's marine strategy) from status assessment to measures.

**Table 46.** The status of environmental quality standards (2021) and which measures in the programme of measures for the marine environment 2022-2027 have been decided in relation to the respective EQS60.

Environmental Quality Standard (EQS) HVMFS 2012-18	Assessment MKN	Related indicator (s)	Measures in the Action Programme for the Marine
<b>A.1 The supply of nutrients from human activities shall be reduced until it does not cause concentrations of nitrogen and phosphorus in the marine environment that prevent the achievement of good environmental status</b>	<b>Non-compliance with the standard</b>	<b>Indicator A.1.1</b> Nitrogen and phosphorus inputs	ÅPH 11 ÅPH 12 ÅPH 38
<b>B.1 Admission of hazardous substances from human activities shall be reduced until it does not cause concentrations of hazardous substances that prevent the achievement of good environmental status</b>	<b>Non-compliance with the standard</b>	<b>Indicator B.1.1</b> Hazardous substances in biota <b>Indicator B.1.2</b> Admission of hazardous substances via atmospheric deposition <b>Indicator B.1.3</b> Entry of hazardous substances from inland waters	ÅPH 15 ÅPH 16 ÅPH 17 ÅPH 37 ÅPH 38 ÅPH 39 ÅPH 40 ÅPH 41
<b>B.2 Hazardous substances in the marine environment introduced by human activities shall not cause adverse effects on biodiversity and ecosystems</b>	<b>Non-compliance with the standard</b>	<b>Indicator B.2.1</b> Seagull eagle eggs shell thickness <b>Indicator B.2.2</b> Number and volumes of detected illegal or accidental spills of oil and oil-like products <b>Indicator B.2.3</b> Effects of organostannic compounds on snails (Imposex)	ÅPH 16 ÅPH 17 ÅPH 38

60Agency for Marine and Water Management (2021) Marine Strategy for the North Sea and the Baltic Sea, Marine Environment Action Programme 2022-2027 under the Marine Environment Ordinance. Report of the Agency for Marine and Water Management 2021-20

Environmental Quality Standard (EQS) HVMFS 2012-18	Assessment MKN	Related indicator (s)	Measures in the Action Programme for the Marine Environment
C.1 The marine environment shall be free from intentionally newly exposed or moved alien species and strains, as well as alien species spread by other means through human activities, which risk adversely affecting genetic or biodiversity or the functioning of the ecosystem.	Non-compliance with the standard	Indicator C.1.1 Trend for introduction of new alien species	ÅPH 1 ÅPH 3 ÅPH 33 ÅPH 15 ÅPH 17
C.3 Populations of all naturally occurring fish species and shellfish affected by fishing have an age and large spawning structure and stock size ensuring their long-term sustainability	Non-compliance with the standard	Indicator C.3.1 Fishing mortality Indicator C.3.2 spawning stock biomass (SSB) for all commercially exploited stocks Indicator C.3.3 Sustainable use of nationally managed fish and shellfish populations	ÅPH 4 ÅPH 5 ÅPH 6 ÅPH 7 ÅPH 8 ÅPH 9 ÅPH 34 ÅPH 35 ÅPH 36 ÅPH 46
C.4 The presence, species composition and size distribution of the fish community shall enable essential functions of the food web to be maintained	Non-compliance with the standard	Indicator C.4.1 size structure of the fish community in seawater Indicator C.4.2 size structure of key fish species in coastal waters – cod Indicator C.4.3 size structure of key fish species in coastal waters – bass	ÅPH 46 ÅPH 4 ÅPH 5 ÅPH 6 ÅPH 7 ÅPH 8 ÅPH 9 ÅPH 34 ÅPH 35 ÅPH 36 ÅPH 44
D.1 The extent of human activity not on the sea-bed area shall be sufficient to maintain the structure and function of the bottom for each habitat type.	Non-compliance with the standard	Indicator D.1.1 Physical disturbance on the seabed from bottom trawling Indicator D.1.2 Physical loss of sandbanks and reefs	ÅPH 36
D.2 The area of biogenic substrates shall be maintained or increased by BIBE	Assessment not possible	No indicators for EQS D.2	ÅPH 36
D.3 Continuous changes in Hydrographical conditions due to large-scale activities, individual or interacting, shall not adversely affect biodiversity and ecosystems	The standard is complied with	No indicators for EQS D.3	ÅPH 13 ÅPH 14
E.1 Marine environment shall, as far as possible, be free from litter	Non-compliance with the standard	Indicator E.1.1 Quantity of litter on reference beaches Indicator E.1.2 Sea-bed litter amount	ÅPH 19 ÅPH 20 ÅPH 21 ÅPH 22 ÅPH 23 ÅPH 34 ÅPH 42
E.2 Human activities shall not cause harmful impulsive noise in marine mammals' range areas during periods of sensitivity to disturbance	Assessment not possible	No indicators for EQS E.2	ÅPH 43